

# A Rare Case of Intermittent Calf Pain: Gastrocnemius Fatty Degeneration

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## Summary

Intermittent calf pain is also called claudication. It is common in patients with spinal canal stenosis or those with peripheral vascular occlusion disorders. It is rarely found in local muscle pathology. We herein report a case of a 50-year-old man who presented with left-sided calf pain on mild exertion. On evaluation, the systemic review was normal, with no spondylosis or vascular pathology, but with local fatty degeneration in the gastrocnemius, which was causing the calf pain. He was given analgesics and underwent physiotherapy and counseling, and his condition improved over 6 months.

**Keywords:** Claudication, Intermittent calf pain, Gastrocnemius, Fatty degeneration

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## Introduction

Intermittent calf pain, also referred to as claudication, is common in patients who have vascular atherosclerosis. This leads to varied degrees of ischemia to the muscles of the leg, which presents as pain in the calf on exertion. It could also be due to spinal canal stenosis, which has a similar presentation, but it has additional spondylosis symptoms of numbness and or burning sensation in the affected body region (1).

Claudication affects 21–24% of the population who are younger than 60 years and 30–35% of those who are older than 70 years (2). Women are more affected than men in developing countries such as ours, i.e., Kenya. Claudication is commonly seen in smokers and diabetics with predilection for the hip, thigh, and calf (in order of frequency) (3). Local causes of claudication are very rare, and fatty degeneration is a rarer cause of claudication as an entity in the absence of the above two conditions, and it is a diagnosis by exclusion (4), especially in female patients.

Osteoarthritis of the adjacent joints leads to poor physical performance and strength in the associated group of muscles. It is known to occur in the thigh and calf as a sequelae of hip and knee joint arthritis. Disuse atrophy and fat infiltration occur in these muscles and impact on their functionality (5). Gastrocnemius degeneration is known to cause knee pain in rare occasions (5).

There are other myopathies in literature such as nemaline myopathy (6) and Miyoshi myopathy (7), which present as calf pain and reduced regional functional performance, especially in the Asian population, in which these rare congenital muscle anomalies are more common.

Although rare, its significant local muscle pathology broadens the scope of differential diagnosis for claudication beyond the commonly known systemic pathologies and when managing a patient's local pathology such as fat degeneration and myopathies.

### Case presentation

A 50-year-old personnel officer, who was previously an athlete and does not smoke or drink alcoholic, presented with complaints of pain of the left calf for 6 months. The pain was insidious, and it was worsened by activity such as walking or running, which he does as a hobby and to maintain fitness, but he is no longer a high-performing athlete. After about 500 m of walking or 20 minutes of brisk walking, calf pain occurs, and he was unable to walk until he rests for 10 minutes or more, after which he can resume the activity. He had no history of low back pain, numbness of the legs, trauma to the leg, or chronic illness such as diabetes mellitus or hypertension. He had used both topical and oral nerve modulators without improvement.

On examination, we found a healthy, 82-kg man, with body mass index of 28, good general condition, and without anemia or lower limb edema. All the observations were normal. The left calf muscle was tender on the medial side. The calf was soft and non-shiny, with a circumference of 38 cm measured at 6 cm from the tibial tuberosity. On peripheral vascularity assessment, the popliteal artery and dorsalis pedis artery pulses were of normal volume character and rhythm. The ankle brachial index was 1. The muscle power grade was 5/5 in all the compartments of the leg. The ankle reflexes were all normal. Right leg circumference was 35 cm measured at 6 cm from the tibial tuberosity. It was not tender or shiny. The muscle tone was normal, with power grade of 5/5. The popliteal artery, posterior tibia, and dorsalis pedis pulses were present and with good volume and rhythm; ankle reflexes were all normal. Spine examination was essentially normal. In the cardiovascular assessment, the apex beat was at the fourth intercostal space, with normal heart sounds and with no murmurs.

Radiography and computed tomography (CT) scanning of the leg were done, and a notable finding was a reduction of muscle bulk but with normal bones. The CT scan showed fat degeneration of the gastrocnemius; thus, histology of the muscle was ordered. Hematoxylin and eosin staining of the gastrocnemius muscle revealed features consistent with fatty degeneration of the muscles.

Treatments included physiotherapy (which comprised isometric muscle contraction, massage, and joint range of motion daily for 20 minutes for 1 month then 3 days per week as tolerated), oral analgesic aceclofenac for a week, etoricoxib for 2 weeks, and ketoprofen (Fastum cream; A. Menarini, Florence, Italy) for 2 weeks. He was advised to avoid activities that would strain that muscle such as jogging, but brisk walking for 20 minutes three times a week and normal activities of daily living were allowed.

His condition improved, with less pain and increased activity tolerance and distance covered without compromise over 6 months of follow-up.

### Discussion

Fatty degeneration of the gastrocnemius that causes muscle wasting and intermittent calf pain is rare. Most of the cases are caused by either arterial occlusion, as seen in atherosclerosis, or as a sequelae of spinal canal stenosis (1).

In our case report, it was of note that this was an incidental finding, i.e., diagnosed by exclusion, as the muscle was slightly bulkier but with reduced tone, and CT angiogram and biopsy showed fatty degeneration of the sampled muscle.

The patient had presented with classical claudication symptoms of pain on prolonged exertion which was relieved by rest, as observed by Munakomi et al. (1). He did not have spinal stenosis or vascular occlusive disorder. These were ruled out by magnetic resonance imaging (MRI) scan of the spine and CT angiogram. Fatty replacement of the gastrocnemius muscle does present with painful swelling of the calf on exertion, as seen in this 50-year-old patient.

Rasull (4) reported a case of a 50-year-old man with a 3-month duration of right calf pain without history of trauma; similar to our case, on further evaluation by MRI, it was determined to be due to fatty replacement of the gastrocnemius muscle belly.

In the literature, fatty degeneration of muscles presenting as painful episodes on exertion is associated with other local muscle structural pathologies such as chronic tendon tears. Hoffmann et al. (5), in their study of 45 patients with chronic Achilles tendon tear, found

that partial tear of the Achilles tendon presented with fatty degeneration of the muscle belly of the gastrocnemius in 32% of the cases, and in those with complete Achilles tendon tear, 47% had fatty degeneration of the gastrocnemius and presented with claudication pain. This occurrence was higher than in those normal non-injured tendons ( $p=0.032$ ). Achilles tendon tear leads to fatty degeneration due to reduced muscle strength and activity.

In a study on fatty infiltration of the thigh and calf in female patients presenting with muscular pain in osteoarthritis, Davison et al. (6) found a relationship between thigh muscles fat infiltration and the severity of osteoarthritis and calf pain.

This was probably due to reduced physical performance and strength of the muscles as a sequelae of osteoarthritis in the adjacent joints. It was greater in the thigh than in the calf, although both the muscles underwent such changes. In our case, the patient had mild osteoarthritis, but his level of performance was good. Although the condition could probably be a result of osteoarthritis in the corresponding limb, the non-infiltrated limb did not have claudication pain; therefore, osteoarthritis was not a primary cause of the calf pain on exertion.

Ikeda et al. (7) found intramural fatty infiltration of the soleus and gastrocnemius in the MRI of a 27-year-old patient who had developed gait disturbance and calf pain, and based on histochemistry, the patient was diagnosed with nemaline myopathy, a rare congenital skeletal muscles anomaly. We were unable to determine this in our patient as the cause of the degeneration, but this histology showed fatty change, and the CT angiogram revealed fatty degeneration on the medial head of the gastrocnemius. Neusch et al. (8) observed a late-onset myopathy of the posterior calf muscles with fatty degeneration in a 59-year-old white man with knee and calf myalgia resembling the Miyoshi phenotype.

Fatty degeneration of any cause would cause symptoms of claudication that can mimic the commonly known referred pain from spinal stenosis or classical vascular occlusion due to atherosclerosis; thus, we should look out for it to avoid prolonged investigation and misdiagnosis.

We managed this case with analgesics, physiotherapy, and activity modification, and the patient recovered well.

### Conclusion

Local causes of claudication are fat degeneration of the gastrocnemius muscles and congenital myopathies such as nemaline myopathy. Fatty degeneration of the gastrocnemius can cause claudication, and its treatment include activity modification, physiotherapy, both oral and topical analgesics.

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